

Claims

1. A reversible axial piston machine (1) having a cylinder drum (5) which rotates about an axis of rotation (7) and in the cylinder cutouts of which pistons (6), which are supported against an inclined surface (8), are movable, the control angle (α_1, α_2) of said inclined surface being adjustable by an adjusting device (12), the adjusting device (12) having a control piston (24) which adjusts the control angle (α_1, α_2) in both pivotal directions and extends with a substantial direction component parallel to the direction of the axis of rotation (7) of the cylinder drum (5),
characterised in that
the zero position of the inclined surface (8), in which the inclined surface (8) is oriented perpendicularly to the axis of rotation (7) of the cylinder drum (5), can be set without play by a zero-position setting device (32).
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2. A reversible axial piston machine according to Claim 1,
characterised in that
the zero-position setting device (32) comprises a first adjusting rod (39) which is positionably guided in a stepped cutout (37) of the control piston (24), said cutout extending in the direction of the longitudinal axis (11) of the control piston (24), and positions the control piston (24) in the two directions of its longitudinal axis (11).
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3. A reversible axial piston machine according to Claim 1 or 2,

characterised in that

the inclined surface (8) is constructed on a rotatably mounted pivot balance (9).

5 4. A reversible axial piston machine according to Claim 2,

characterised in that

the control piston (24) is guided in a hollow cylinder (13) which has a first step (14) on its inside and whereof the first opening (15), which is oriented in the direction of the inclined surface (8), is not closed in order to also enable an axial movement of the control piston (24) outside the hollow cylinder (13), and whereof the second opening (18), which is oriented away from the pivot balance (9), is closed by a closing cover (19).

15 5. A reversible axial piston machine according to Claim 4,

characterised in that

the position of the first adjusting rod (39) outside the adjusting device (12) is set by the first adjusting rod (39) being guided out of the hollow cylinder (13) of the adjusting device (12) by way of the closing cover (19).

25 6. A reversible axial piston machine according to Claim 4

or 5,

characterised in that

the control piston (24) is positioned in one of the two directions of the longitudinal axis (11) of the control piston (24) by a respective first and second spring plate (43, 44) which is each fixed on the first adjusting rod (39).

7. A reversible axial piston machine according to Claim 6,
characterised in that

the first spring plate (43) is fixed on the first
5 adjusting rod (39) in that the first spring plate (43)
is pressed against the inside end face (46) of a
closing flange (47) by the spring force of at least one
pretensioned pressure spring (45) located between the
first and second spring plate (43, 44), said closing
10 flange being mounted on that end of the first adjusting
rod (39) which is located inside the hollow cylinder
(13) of the adjusting device (12).

8. A reversible axial piston machine according to Claim 7,
15 **characterised in that**

the second spring plate (44) is fixed on the first
adjusting rod (39) in that the second spring plate (44)
is pressed against a sleeve (48) by the spring force of
the pretensioned pressure spring (45, 45A, 45B), said
20 sleeve being guided between the second spring
plate (44) and the closing cover (19) on the adjusting
rod (39).

9. A reversible axial piston machine according to one of
25 Claims 6 to 8,

characterised in that
the control piston (24) is positioned in the direction
of the first opening (15) of the hollow cylinder (13)
in that the first spring plate (43) is pressed against
30 the end face of a second step (42) of the cutout (37)
of the control piston (24) as a result of the first

adjusting rod (39) being positioned in the direction of the first opening (15) of the hollow cylinder (13).

10. A reversible axial piston machine according to one of
5 Claims 6 to 9,

characterised in that

the control piston (24) is positioned in the direction of the second opening (18) of the hollow cylinder (13) in that the second spring plate (44) is pressed
10 against a snap ring (51) as a result of the first adjusting rod (39) being positioned in the direction of the second opening (18) of the hollow cylinder (13), said snap ring being guided in an annular groove along the side face of the cutout (37) of the control
15 piston (24) in the region of the third opening (38) of the cutout (37).

11. A reversible axial piston machine according to one of
Claims 4 to 10,

20 **characterised in that**

the closing cover (19) has an annular web (20) whereof the external diameter corresponds to the internal diameter of the hollow cylinder (13) from the second opening (18) to the first step (14) of the hollow
25 cylinder (13), and whereof the internal diameter corresponds to the internal diameter of the hollow cylinder (13) from the first step (14) to the first opening (15) of the hollow cylinder (13).

30 12. A reversible axial piston machine according to
Claim 11,

characterised in that

the closing cover (19) is guided in the second opening (18) of the hollow cylinder (13) by means of its tubular web (20) in such a way that a cavity (28, 29) is produced between the hollow cylinder (13),
5 the closing cover (19) and the control piston (24) and, at the same time, the control piston (24) is mounted on the inner side wall of the annular web (20) of the closing cover (19) and the inner side wall of the hollow cylinder (13) between the first step (14) 10 and the first opening (15) of the hollow cylinder (13).

13. A reversible axial piston machine according to
Claim 12,

15 **characterised in that**
the control piston (24) has, on its lateral surface in the region of the cavity (28, 29), a widening (26) which reaches to the inner side wall of the hollow cylinder (13) and divides the cavity (28, 29) into a
20 first control pressure chamber (28) and a second control pressure chamber (29).

14. A reversible axial piston machine according to
Claim 13,

25 **characterised in that**
the first and second control pressure chambers (28, 29) are each supplied with a control pressure by way of a respective control pressure opening (31, 33) in the wall of the hollow cylinder (13).

30 15. A reversible axial piston machine according to Claim 13 or 14,

characterised in that

the two side faces (30, 32) of the widening (26) of
the control piston (24) serve as working surfaces for
the two control pressures for displacing the control
piston (24) in the two directions along the
longitudinal axis (11) of the control piston (24).

5 16. A reversible axial piston machine according to
 Claim 15,

10 **characterised in that,**
 with a defined control pressure, the control
 piston (24) effects an equal control angle (α_1, α_2) of
 the inclined surface (8) in both pivotal directions as
 a result of the working surfaces of the control
15 piston (24) being of equal size.

17. A reversible axial piston machine according to one of
 Claims 3 to 16,

20 **characterised in that,**
 the control piston (24), which is axially movable in
 the direction of its longitudinal axis (11), is
 attached with form fit to the pivot balance (9) by way
 of a slide block (56) which is mounted in a
 groove (57) of the control piston (24) and has a
25 cutout in which a journal connected to the pivot
 balance (9) by way of a connecting arm (58) is fixedly
 mounted.

30 18. A reversible axial piston machine according to
 Claim 7,
 characterised in that,

with an equal excursion of the control piston (24) in one of the two directions along the longitudinal axis (11) of the control piston (24), the pressure spring (45, 45A, 45B), which is fixed in the
5 cutout (37) of the control piston (24) on the first adjusting rod (39), generates an equal restoring force for both directions of the excursion as a result of a defined control pressure.

10 19. A reversible axial piston machine according to
Claim 4,
characterised in that,
the axial excursion of the control piston (24) along
the longitudinal axis (11) of the control piston (24)
15 is adjustably delimited by way of a second adjusting
rod (52), which is guided out of the hollow cylinder
(13) of the adjusting device (12) by way of the
closing cover (19).